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FILE COVERS 1907 - 12 May 2006  VOL 144 ISS 21
FILE LAST UPDATED: 11 May 2006  (20060511/ED)

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STRUCTURE FILE UPDATES:    11 MAY 2006  HIGHEST RN 883943-03-1
DICTIONARY FILE UPDATES:   11 MAY 2006  HIGHEST RN 883943-03-1

New CAS Information Use Policies, enter HELP USAGETERMS for details.

TSCA INFORMATION NOW CURRENT THROUGH January 6, 2006

  Please note that search-term pricing does apply when
  conducting SmartSELECT searches.

*********************************************************************
*                                                                   *
* The CA roles and document type information have been removed from *
* the IDE default display format and the ED field has been added,   *
* effective March 20, 2005.  A new display format, IDERL, is now    *
* available and contains the CA role and document type information. *
*                                                                   *
*********************************************************************

Structure search iteration limits have been increased.  See HELP SLIMITS
for details.

REGISTRY includes numerically searchable data for experimental and
predicted properties as well as tags indicating availability of
experimental property data in the original document.  For information
on property searching in REGISTRY, refer to:

http://www.cas.org/ONLINE/UG/regprops.html

=> s astaxanthin/cn
L5             1 ASTAXANTHIN/CN

=> s zeaxanthin/cn
L6             1 ZEAXANTHIN/CN

=> d l5
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L5   ANSWER 1 OF 1  REGISTRY  COPYRIGHT 2006 ACS on STN
RN   472-61-7  REGISTRY
ED   Entered STN:  16 Nov 1984
CN   β,β-Carotene-4,4'-dione, 3,3'-dihydroxy-, (3S,3'S)- (9CI)  (CA
     INDEX NAME)
OTHER CA INDEX NAMES:
CN   β-Carotene-4,4'-dione, 3,3'-dihydroxy-, all-trans- (8CI)
CN   Astaxanthin (6CI)
OTHER NAMES:
CN   (3S,3'S)-all-trans-Astaxanthin
CN   (3S,3'S)-Astaxanthin
CN   (3S,3'S)-Astaxanthin
CN   all-trans-Astaxanthin
CN   AstaREAL
CN   Astaxanthin, all-trans-
CN   BioAstin
CN   BioAstin oleoresin
CN   Carophyll Pink
CN   Lucantin Pink
CN   Natupink
CN   Ovoester
CN   trans-Astaxanthin
FS   STEREOSEARCH
DR   346585-67-9
MF   C40 H52 O4
CI   COM
LC   STN Files:   AGRICOLA, ANABSTR, BEILSTEIN*, BIOSIS, BIOTECHNO, CA, CABA,
       CAOLD, CAPLUS, CASREACT, CBNB, CHEMCATS, CHEMLIST, CIN, CSCHEM, DDFU,
       DRUGU, EMBASE, IFICDB, IFIPAT, IFIUDB, IPA, MEDLINE, MRCK*, NAPRALERT,
       PROMT, RTECS*, SPECINFO, TOXCENTER, USPAT2, USPATFULL, VETU
         (*File contains numerically searchable property data)
     Other Sources:   EINECS**
         (**Enter CHEMLIST File for up-to-date regulatory information)

Absolute stereochemistry.
Double bond geometry as shown.

                                                          PAGE 1-A
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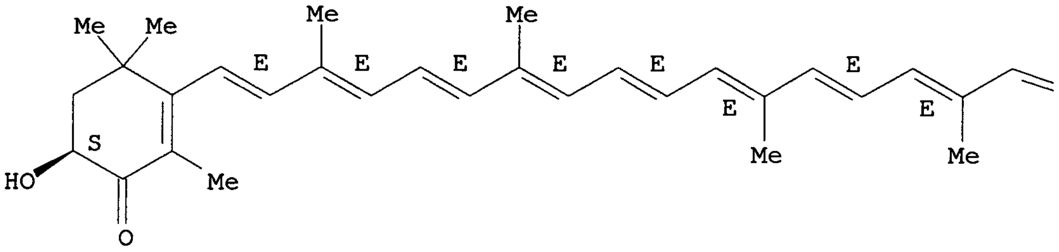

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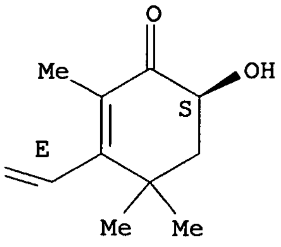

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**PROPERTY DATA AVAILABLE IN THE 'PROP' FORMAT**

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             259 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
            2245 REFERENCES IN FILE CAPLUS (1907 TO DATE)
              44 REFERENCES IN FILE CAOLD (PRIOR TO 1967)


=> d 16

L6   ANSWER 1 OF 1  REGISTRY  COPYRIGHT 2006 ACS on STN
RN   144-68-3  REGISTRY
ED   Entered STN:  16 Nov 1984
CN   β,β-Carotene-3,3'-diol, (3R,3'R)- (9CI)  (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN   β-Carotene-3,3'-diol, (3R,3'R)-all-trans- (6CI, 8CI)
CN   Zeaxanthin (7CI)
OTHER NAMES:
CN   (3R,3'R)-Zeaxanthin
CN   all-trans-Anchovyxanthin
CN   all-trans-Zeaxanthin
CN   Anchovyxanthin
CN   Anchovyxanthin, all-trans-
CN   Xanthophyll 3
CN   Zeaxanthin, all-trans-
CN   Zeaxanthol
FS   STEREOSEARCH
DR   32638-35-0, 34182-33-7
MF   C40 H56 O2
CI   COM
LC   STN Files:   ADISNEWS, AGRICOLA, ANABSTR, BEILSTEIN*, BIOSIS, BIOTECHNO,
       CA, CABA, CAOLD, CAPLUS, CASREACT, CBNB, CHEMCATS, CHEMINFORMRX,
       CHEMLIST, CIN, CSCHEM, DDFU, DRUGU, EMBASE, IFICDB, IFIPAT, IFIUDB, IPA,
       MEDLINE, MRCK*, NAPRALERT, PROMT, SPECINFO, TOXCENTER, USPAT2,
       USPATFULL, VETU
         (*File contains numerically searchable property data)
     Other Sources:   EINECS**
         (**Enter CHEMLIST File for up-to-date regulatory information)

Absolute stereochemistry.
Double bond geometry as shown.
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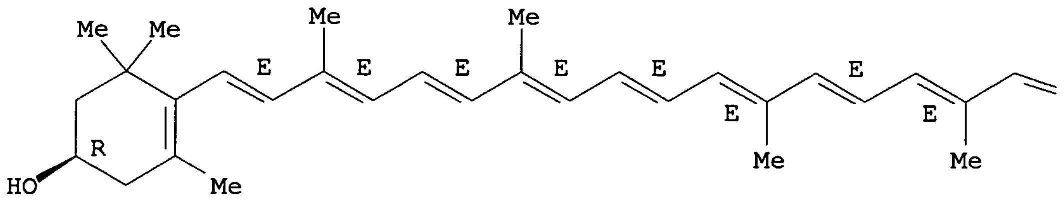
PAGE 1-A



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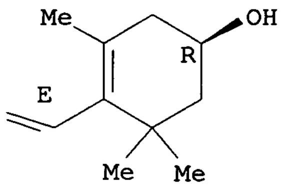

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            3726 REFERENCES IN FILE CAPLUS (1907 TO DATE)
              36 REFERENCES IN FILE CAOLD (PRIOR TO 1967)


=> s 472-61-7 and 144-68-3
             1 472-61-7
                 (472-61-7/RN)
             1 144-68-3
                 (144-68-3/RN)
L7           0 472-61-7 AND 144-68-3

=> file caplus
COST IN U.S. DOLLARS                            SINCE FILE     TOTAL
                                                     ENTRY   SESSION
FULL ESTIMATED COST                                  16.40     61.97

DISCOUNT AMOUNTS (FOR QUALIFYING ACCOUNTS)      SINCE FILE     TOTAL
                                                     ENTRY   SESSION
CA SUBSCRIBER PRICE                                   0.00     -6.75

FILE 'CAPLUS' ENTERED AT 13:22:18 ON 12 MAY 2006
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FILE COVERS 1907 - 12 May 2006  VOL 144 ISS 21
FILE LAST UPDATED: 11 May 2006  (20060511/ED)

Effective October 17, 2005, revised CAS Information Use Policies apply.
They are available for your review at:

http://www.cas.org/infopolicy.html

=> s 472-61-7 and 144-68-3
   REG1stRY INITIATED
Substance data SEARCH and crossover from CAS REGISTRY in progress...
Use DISPLAY HITSTR (or FHITSTR) to directly view retrieved structures.





L9         3726 L8


   REG1stRY INITIATED
Substance data SEARCH and crossover from CAS REGISTRY in progress...
Use DISPLAY HITSTR (or FHITSTR) to directly view retrieved structures.





L11        2245 L10


L12         596 L11 AND L9


=> s l12 and ester? and acyl?
        899190 ESTER?
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L13           6 L12 AND ESTER? AND ACYL?

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      21818878 PY<2002
L14           0 L13 AND PY<2002

=> d 1-6 l13 ibib abs hitstr

L13  ANSWER 1 OF 6  CAPLUS  COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER:         2006:343222  CAPLUS
DOCUMENT NUMBER:          144:391181
TITLE:                    Methods for synthesis of chiral intermediates of
                          carotenoids, carotenoid analogs, and carotenoid
                          derivatives
INVENTOR(S):              Lockwood, Samuel F.; Tang, Peng Cho; Nadolski, Geoff;
                          Fang, Zhiqiang; Du, Yishu; Geiss, William; Williams,
                          Richard; Burdick, William; Yang, Min
PATENT ASSIGNEE(S):       Hawaii Biotech, Inc., USA
SOURCE:                   78 pp.
DOCUMENT TYPE:            Patent
LANGUAGE:                 English
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FAMILY ACC. NUM. COUNT:  1
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     WO 2006039685        A2    20060413    WO 2005-US35599        20051003
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             CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD,
             GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ,
             LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ,
             NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG,
             SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN,
             YU, ZA, ZM, ZW
         RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE,
             IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ,
             CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW, GH,
             GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY,
             KG, KZ, MD, RU, TJ, TM
     US 2006088904        A1    20060427    US 2005-242591         20051003
     US 2006088905        A1    20060427    US 2005-242639         20051003
PRIORITY APPLN. INFO.:                      US 2004-615032P     P  20041001
                                            US 2005-675957P     P  20050429
                                            US 2005-691518P     P  20050617
                                            US 2005-692682P     P  20050621
                                            US 2005-699653P     P  20050715
                                            US 2005-702380P     P  20050726
                                            US 2005-712350P     P  20050830
GI



* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY -  AVAILABLE VIA OFFLINE PRINT *

AB   A method used for synthesizing intermediates for use in the synthesis of
     carotenoids and carotenoid analogs, and/or carotenoid derivs.  In some
     embodiments, the invention includes methods for synthesizing optically
     active intermediates useful for the synthesis of optically active
     carotenoids.  One method for preparation of carotenoids comprises: (a)
     contacting diketone I [R = alkyl, Me, Ph, aryl] with a chiral catalyst to
     produce hydroxy ketone II as a single diastereomer; (b) contacting II with
     a reducing agent to produce diol III; (c) converting III to protected
     hydroxyketone IV [R1 = alkyl, Ph, aryl, silyl]; conversion of IV to alkyne
     V [R2 = CMe:CHCH2OR1, CMe(OR1)CH:CH2] by reaction with MC.tplbond.CR2 [M =
     metal] to give diol VI followed by oxidation; (d) conversion of V to
     conjugated ketone VII [R3 = P(R4)3, P(O)(R4)3, SO2R4, M; R4 = alkyl, Ph,
     aryl; M = Li, Na, MgBr] or triene VIII; and (e) reaction of the latter
     with OHCCMe:CHCH:CHCH:CMeCHO-(E,E,E).
IT   144-68-3P, (3R,3'R)-Zeaxanthin 472-61-7P,
     (3S,3'S)-Astaxanthin
     RL: SPN (Synthetic preparation); PREP (Preparation)
        (synthesis of chiral intermediates of carotenoids, analogs and derivs.)
RN   144-68-3  CAPLUS
CN   β,β-Carotene-3,3'-diol, (3R,3'R)- (9CI)  (CA INDEX NAME)

Absolute stereochemistry.
Double bond geometry as shown.
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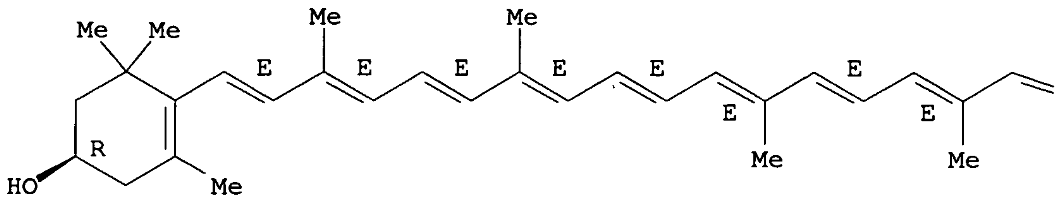
PAGE 1-A



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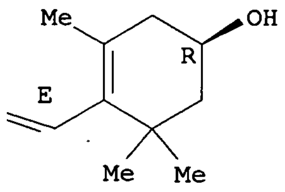
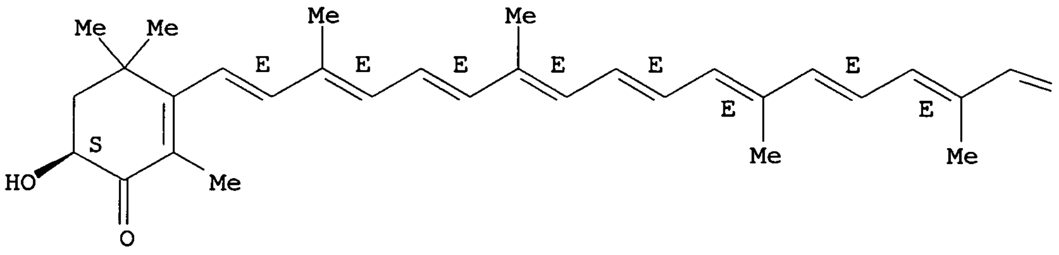


RN 472-61-7 CAPLUS
CN β,β-Carotene-4,4'-dione, 3,3'-dihydroxy-, (3S,3'S)- (9CI) (CA
INDEX NAME)

Absolute stereochemistry.
Double bond geometry as shown.

PAGE 1-A



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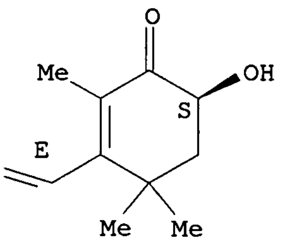

L13 ANSWER 2 OF 6 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2005:1166320 CAPLUS
DOCUMENT NUMBER: 143:387199
TITLE: Process for the preparation of astaxanthin

INVENTOR(S): Sanroma Virgili, Nuria; Fernandez Martin, Juan Antonio
PATENT ASSIGNEE(S): Carotenoid Technologies, S.A., Spain
SOURCE: Span., 12 pp.
CODEN: SPXXAD
DOCUMENT TYPE: Patent
LANGUAGE: Spanish
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
ES 2223270	A1	20050216	ES 2003-926	20030410
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PRIORITY APPLN. INFO.: ES 2003-926 20030410
OTHER SOURCE(S): MARPAT 143:387199
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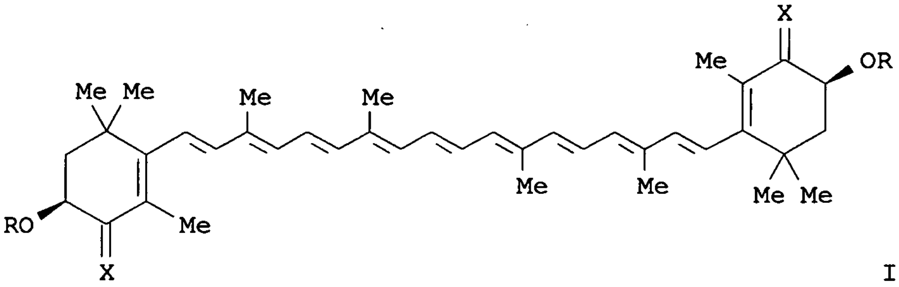


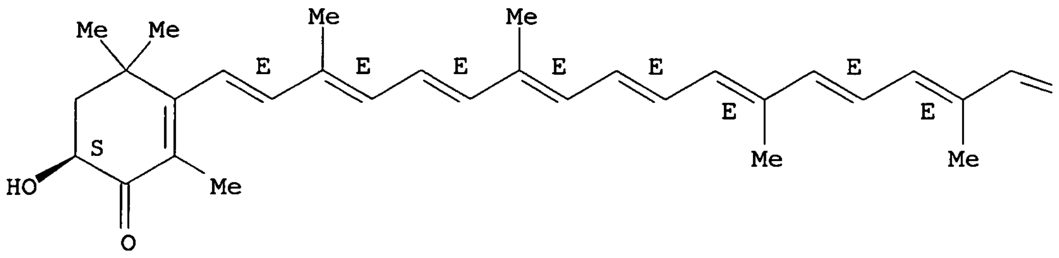
I

AB A procedure was disclosed for the preparation of astaxanthin I (R = H, X = O) and comprised di-O-**acylation** of the hydroxyl groups of zeaxanthin I (R = H, X = H2) using an **acyl** chloride or an acid anhydride, such as R1Cl or (R1)2O [R1 = COMe, COCH2Cl, palmitoyl, etc.], oxidation of the resulting di-O-**acylated** product I (R = COMe, COCH2Cl, palmitoyl, etc.; X = H2) using an oxidizing agent, such as PCC, to form the corresponding di-O-**acyl**-diketone I (X = O), and finally, saponification of the resulting di-O-**acyl**-diketone.

IT **472-61-7P,** Astaxanthin
RL: IMF (Industrial manufacture); SPN (Synthetic preparation); PREP (Preparation)
(process for the preparation of astaxanthin)
RN 472-61-7 CAPLUS
CN β,β-Carotene-4,4'-dione, 3,3'-dihydroxy-, (3S,3'S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry.
Double bond geometry as shown.

PAGE 1-A



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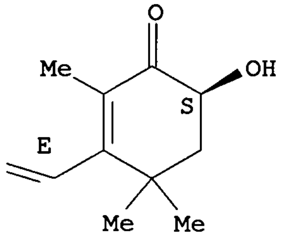
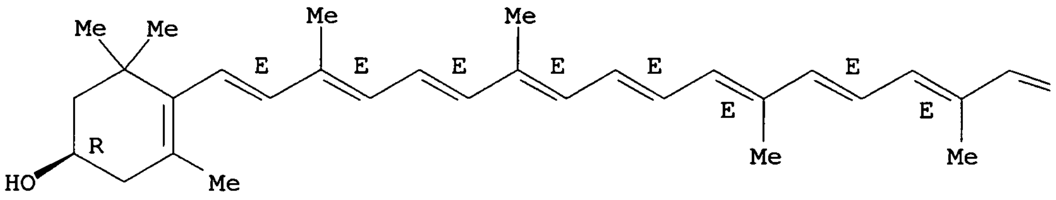


IT 144-68-3, Zeaxanthin
RL: RCT (Reactant); RACT (Reactant or reagent)
(process for the preparation of astaxanthin)
RN 144-68-3 CAPLUS
CN β,β-Carotene-3,3'-diol, (3R,3'R)- (9CI) (CA INDEX NAME)

Absolute stereochemistry.
Double bond geometry as shown.

PAGE 1-A



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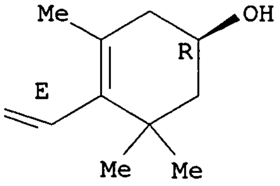

L13 ANSWER 3 OF 6 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2005:570539 CAPLUS

DOCUMENT NUMBER: 143:78324
TITLE: Carotenoid analogs or derivatives for the inhibition and amelioration of ischemic reperfusion injury
INVENTOR(S): Lockwood, Samuel Fournier; O'Malley, Sean; Watumull, David G.; Hix, Laura M.; Jackson, Henry; Nadolski, Geoff
PATENT ASSIGNEE(S): USA
SOURCE: U.S. Pat. Appl. Publ., 135 pp., Cont.-in-part of U.S. Ser. No. 629,538.
CODEN: USXXCO
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 15
PATENT INFORMATION:

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	US 2004162329	A1	20040819	US 2003-629538		20030729
	US 2005037995	A1	20050217	US 2004-793703		20040304
	US 2005065097	A1	20050324	US 2004-793696		20040304
	US 2005075337	A1	20050407	US 2004-793702		20040304
PRIORITY APPLN. INFO.:				US 2002-399194P	P	20020729
				US 2003-467973P	P	20030505
				US 2003-472831P	P	20030522
				US 2003-473741P	P	20030528
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OTHER SOURCE(S): MARPAT 143:78324
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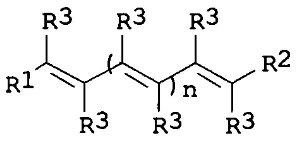
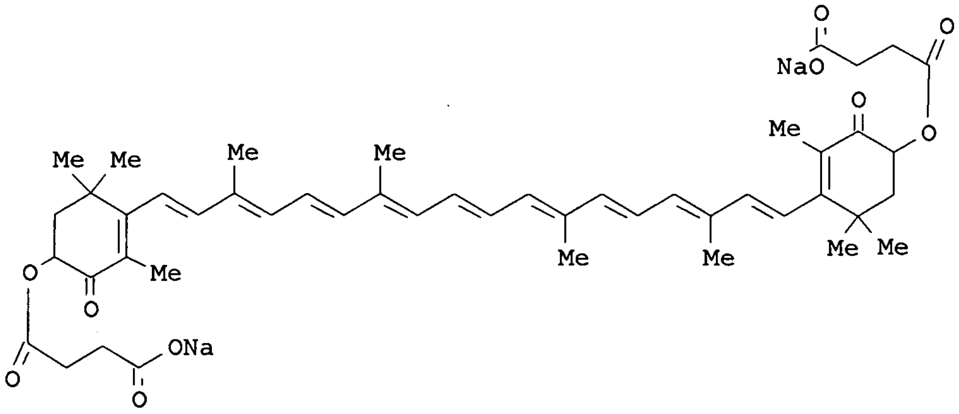




AB A method of treating ischemic reperfusion injury in a subject. The method may include administering to the subject an effective amount of a pharmaceutically acceptable formulation. The pharmaceutically acceptable formulation may include a synthetic analog or derivative I [R1, R2 = acyclic alkene, C4-10-ring with at least one substituent; R3 = H, Me (may be same or different); n = 5 - 12] of a carotenoid. The subject may be administered a carotenoid analog or derivative, either alone or in combination with another carotenoid analog or derivative, or co-antioxidant formulation. The carotenoid analog may include a conjugated polyene with between 7 to 14 double bonds. The conjugated polyene may include an acyclic alkene including at least one substituent and/or a cyclic ring including at least one substituent. In some embodiments, a carotenoid analog or derivative may include at least one substituent. Thus, (±)-astaxanthin disuccinate disodium salt (II) was prepared from (±)-astaxanthin via **acylation** with succinic anhydride in CH2Cl2 containing EtN(CHMe2)2 and DMAP followed by treatment with NaOEt in EtOH. II was tested for: super oxide inhibition [95% inhibition at 3 mM]; infarct size reduction in Sprague-Rawley rats and Cardax-treated rabbits [55.4%]; plasma pharmacokinetics; tissue accumulation; reduction of alanine aminotransferase elevations in mice; and optical properties of dAST derivative with Human Serum Albumin.

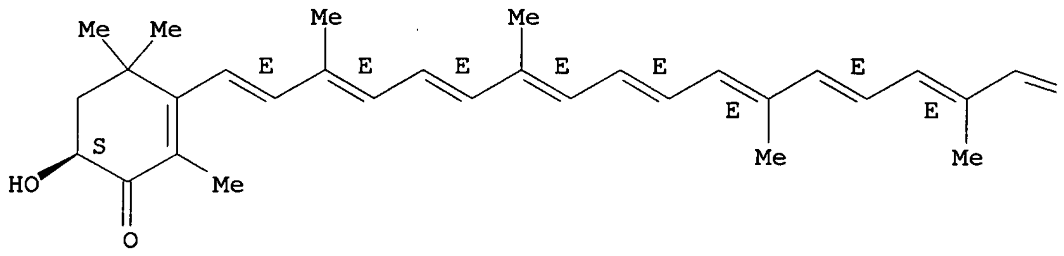
IT **472-61-7**
RL: PRP (Properties); RCT (Reactant); THU (Therapeutic use); BIOL (Biological study); RACT (Reactant or reagent); USES (Uses)
(carotenoid analogs or derivs. for inhibition and amelioration of ischemic reperfusion injury)

RN 472-61-7 CAPLUS

CN β,β-Carotene-4,4'-dione, 3,3'-dihydroxy-, (3S,3'S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry.
Double bond geometry as shown.

PAGE 1-A



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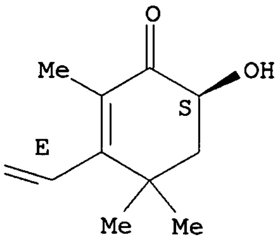


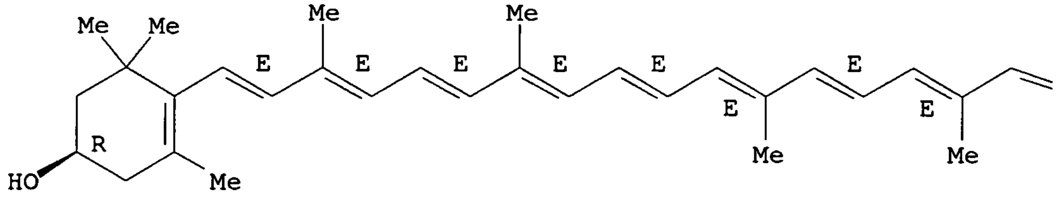
IT **144-68-3**
RL: RCT (Reactant); RACT (Reactant or reagent)

(**esterification** by, of succinic anhydride; carotenoid analogs
or derivs. for inhibition and amelioration of ischemic reperfusion
injury)

RN 144-68-3 CAPLUS
CN β,β-Carotene-3,3'-diol, (3R,3'R)- (9CI) (CA INDEX NAME)

Absolute stereochemistry.
Double bond geometry as shown.

PAGE 1-A



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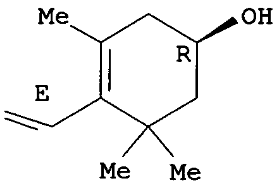

L13 ANSWER 4 OF 6 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2005:99144 CAPLUS
DOCUMENT NUMBER: 142:198233
TITLE: Preparation of carotenoid ether analogs or derivatives for the inhibition and amelioration of liver disease
INVENTOR(S): Lockwood, Samuel Fournier; O'Malley, Sean; Watumull, David G.; Hix, Laura M.; Jackson, Henry; Nadolski, Geoff
PATENT ASSIGNEE(S): USA
SOURCE: U.S. Pat. Appl. Publ., 130 pp., Cont.-in-part of U.S. Ser. No. 629,538.
CODEN: USXXCO
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 15
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.		DATE
US 2005026874	A1	20050203	US 2004-793681		20040304
US 2004162329	A1	20040819	US 2003-629538		20030729
US 2005037995	A1	20050217	US 2004-793703		20040304
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US 2005075337	A1	20050407	US 2004-793702		20040304
PRIORITY APPLN. INFO.:			US 2002-399194P	P	20020729
			US 2003-467973P	P	20030505
			US 2003-472831P	P	20030522
			US 2003-473741P	P	20030528
			US 2003-485304P	P	20030703
			US 2003-629538	A2	20030729

OTHER SOURCE(S): MARPAT 142:198233
GI

* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT *

AB A method of treating liver disease in a subject. The method may include administering to the subject an effective amount of a pharmaceutically acceptable formulation. The pharmaceutically acceptable formulation may include a synthetic analog or derivative I [Z = {CR3:CR3-(E)}z; z = 5 - 12; R3 = H, Me; Y = O, H2; X = P(:O)(OR1)2, S(:O)(OR1)2, X', alkyl-N+(R2)3, aryl-N+(R2)3, alkyl-CO2-, aryl-CO2-, N-protonated amino acid, phosphorylated N-protonated amino acid, polyethylene glycol, dextran, vitamin C, phosphorylated vitamin C, aryl; R1 = alkyl-N+(R2)3, aryl-N+(R2)3, alkyl-CO2-, aryl-CO2-, N-protonated amino acid, phosphorylated N-protonated amino acid, polyethylene glycol, dextran, H, alkyl, aryl, alkali salt; R2 = H, alkyl, aryl; (wherein X enhances the solubility of I allowing at least partial water solubility)] of a carotenoid. The subject may be administered a carotenoid analog or derivative, either alone or in combination with another carotenoid analog or derivative, or co-antioxidant formulation. The carotenoid analog may include a conjugated polyene with between 7 to 14 double bonds. The conjugated polyene may include a cyclic ring including at least one substituent. In some embodiments, a cyclic ring of a carotenoid analog or derivative may include at least one substituent. The substituent may be coupled to the cyclic ring with an ether functionality. Thus, astaxanthin disuccinate ascorbate diester was prepared from astaxanthin via **acylation** with succinic anhydride in CH2Cl2 containing EtNH(CHMe2)2 and catalytic DMAP followed by reaction with 2-O-(tert-butyldimethylsilyl)ascorbic acid in CH2Cl2 containing DMAP and EDCI·HCl. Astaxanthin disuccinate disodium salt was tested for its water solubility, ability to induce Connexin 43 protein expression, induce intercellular gap junction communication, inhibition of carcinogen-induced neoplastic transformation, reduce superoxides in neutrophils, and its plasma pharmacokinetics.

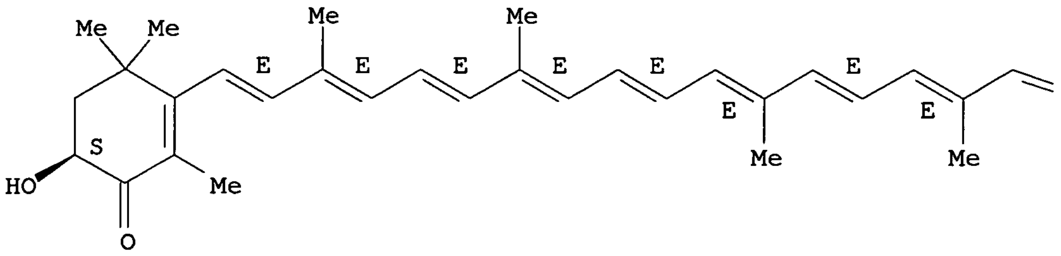
IT **472-61-7P**, (3S,3'S)-Astaxanthin
RL: PAC (Pharmacological activity); PUR (Purification or recovery); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); PREP (Preparation); USES (Uses)
(preparation of carotenoid analogs or derivs. for the inhibition and amelioration of liver disease)

RN 472-61-7 CAPLUS

CN β,β-Carotene-4,4'-dione, 3,3'-dihydroxy-, (3S,3'S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry.
Double bond geometry as shown.

PAGE 1-A



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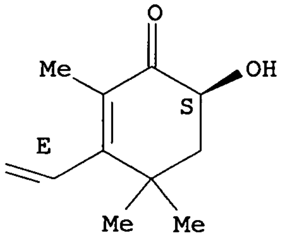


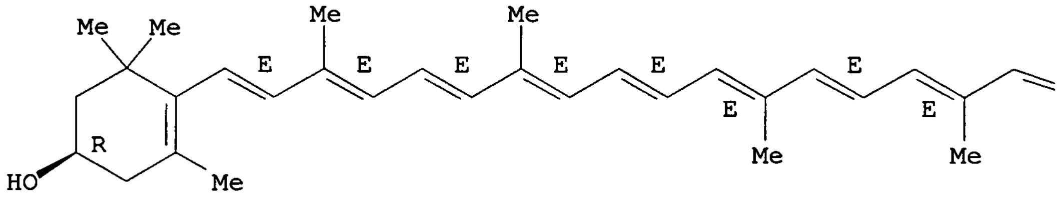
IT   **144-68-3**, Zeaxanthin
      RL: PAC (Pharmacological activity); RCT (Reactant); THU (Therapeutic use);
      BIOL (Biological study); RACT (Reactant or reagent); USES (Uses)
         (reaction of, with succinic anhydride and phosphoric acid derivs.;
         preparation of carotenoid analogs or derivs. for the inhibition and
         amelioration of liver disease)

RN   144-68-3 CAPLUS

CN   β,β-Carotene-3,3'-diol, (3R,3'R)- (9CI) (CA INDEX NAME)

Absolute stereochemistry.
Double bond geometry as shown.

PAGE 1-A



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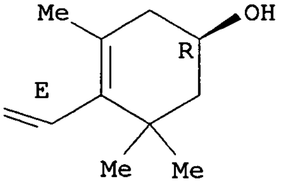

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L13  ANSWER 5 OF 6  CAPLUS  COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER:         2004:392604  CAPLUS
DOCUMENT NUMBER:          140:405911
TITLE:                    Method for producing esterified astaxanthin
                          from esterified zeaxanthin
INVENTOR(S):              Torres-cardona, Mario D.; Rodriguez, Gustavo;
                          Schloemer, George C.
PATENT ASSIGNEE(S):       Prodemex, S.A. De C.V., Mex.
SOURCE:                   PCT Int. Appl., 11 pp.
                          CODEN: PIXXD2
DOCUMENT TYPE:            Patent
LANGUAGE:                 English
FAMILY ACC. NUM. COUNT:   1
PATENT INFORMATION:

     PATENT NO.          KIND    DATE          APPLICATION NO.          DATE
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     WO 2004039991        A2     20040513      WO 2003-US32681          20031014
     WO 2004039991        A3     20040708
         W:  AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN,
             CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE,
             GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK,
             LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ,
             OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
             TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW
         RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY,
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             FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR,
             BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG
     AU 2003277393        A1     20040525      AU 2003-277393           20031014
     US 2004158097        A1     20040812      US 2003-685194           20031014
     EP 1563081           A2     20050817      EP 2003-809947           20031014
         R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
             IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK
PRIORITY APPLN. INFO.:                         US 2002-421623P      P   20021025
                                               WO 2003-US32681      W   20031014
OTHER SOURCE(S):          MARPAT 140:405911
AB   A method is described for preparing astaxanthin esters from
     zeaxanthin by acylation of zeaxanthin with an acylating
     agent followed by contacting the esterified zeaxanthin with an
     oxidizing agent to produce esterified astaxanthin.  The
     astaxanthin esters are more stable and show a better
     bioavailability than free astaxanthin when used in salmonid pigmentation.
IT   144-68-3DP, Zeaxanthin, esters of
     RL: CPS (Chemical process); IMF (Industrial manufacture); PEP (Physical,
     engineering or chemical process); RCT (Reactant); PREP (Preparation); PROC
     (Process); RACT (Reactant or reagent)
        (method for producing esterified astaxanthin from
        esterified zeaxanthin)
RN   144-68-3  CAPLUS
CN   β,β-Carotene-3,3'-diol, (3R,3'R)- (9CI)  (CA INDEX NAME)

Absolute stereochemistry.
Double bond geometry as shown.
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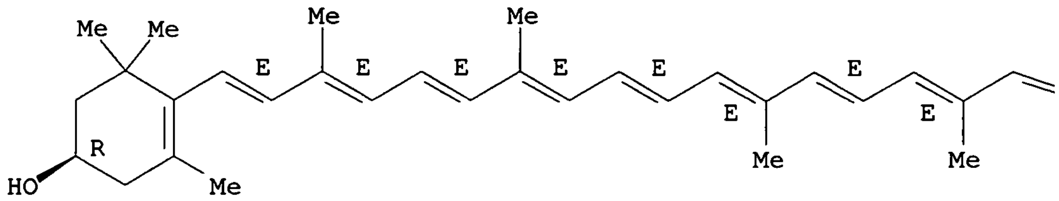
PAGE 1-A



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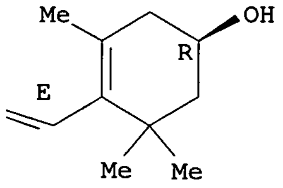
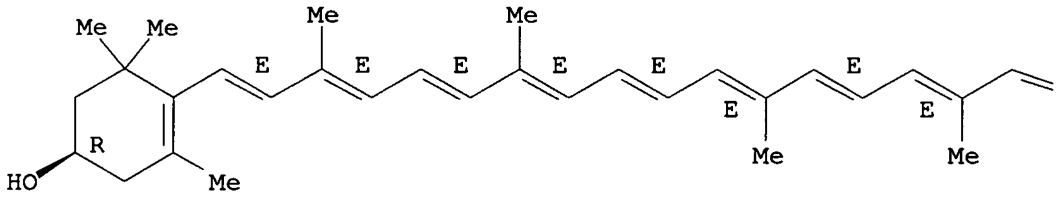


IT **144-68-3P,** Zeaxanthin
RL: CPS (Chemical process); NPO (Natural product occurrence); PEP
(Physical, engineering or chemical process); PUR (Purification or
recovery); RCT (Reactant); BIOL (Biological study); OCCU (Occurrence);
PREP (Preparation); PROC (Process); RACT (Reactant or reagent)
(method for producing **esterified** astaxanthin from
esterified zeaxanthin)
RN 144-68-3 CAPLUS
CN β,β-Carotene-3,3'-diol, (3R,3'R)- (9CI) (CA INDEX NAME)

Absolute stereochemistry.
Double bond geometry as shown.

PAGE 1-A



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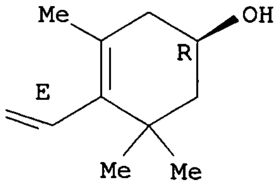
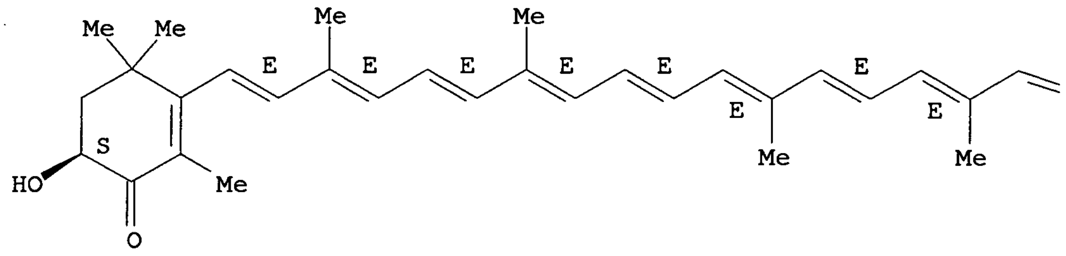


IT **472-61-7DP,** Astaxanthin, **esters** of
RL: FFD (Food or feed use); IMF (Industrial manufacture); PUR
(Purification or recovery); BIOL (Biological study); PREP (Preparation);
USES (Uses)
(method for producing **esterified** astaxanthin from

esterified zeaxanthin)
RN 472-61-7 CAPLUS
CN β,β-Carotene-4,4'-dione, 3,3'-dihydroxy-, (3S,3'S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry.
Double bond geometry as shown.

PAGE 1-A



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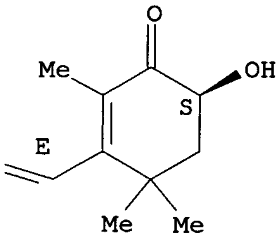


L13 ANSWER 6 OF 6 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2002:274289 CAPLUS
DOCUMENT NUMBER: 136:340071
TITLE: Utilization of (3S,3'S)-astaxanthin **acyl esters** in pigmentation of rainbow trout (Oncorhynchus mykiss)
AUTHOR(S): Bowen, J.; Soutar, C.; Serwata, R. D.; Lagocki, S.; White, D. A.; Davies, S. J.; Young, A. J.
CORPORATE SOURCE: Carotenoid Research Group, School of Biological and Earth Sciences, Liverpool John Moores University, Liverpool, L3 3AF, UK
SOURCE: Aquaculture Nutrition (2002), 8(1), 59-68
CODEN: AQNUF6; ISSN: 1353-5773
PUBLISHER: Blackwell Publishing Ltd.
DOCUMENT TYPE: Journal
LANGUAGE: English

AB The deposition of natural, optically active, astaxanthin fatty acid **esters** in rainbow trout (Oncorhynchus mykiss) was studied. Mono-**esterified** and di-**esterified** (3S,3'S) astaxanthin were purified from the green microalga Haematococcus pluvialis and incorporated into extruded diets and compared with diets containing synthetic racemic astaxanthin (Carophyll Pink) and a total carotenoid extract from the alga. All sources of astaxanthin achieved > 4 mg kg-1 in the white muscle after 6 wk feeding. No significant difference (P > 0.05) between the deposition of astaxanthin or total carotenoid for the different diets was observed

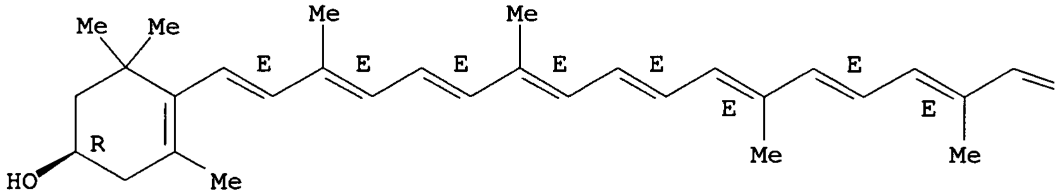
Other xanthophylls, namely lutein, zeaxanthin and idoxanthin were found in the white muscle of rainbow trout fed all diets and together accounted for 10-14% of total carotenoid. Astaxanthin was deposited in the white muscle in the stereochem. form administered in the diet, i.e. racemic astaxanthin for Carophyll Pink and .apprx.100% (3S,3'S)-astaxanthin for the algal sources. In contrast, epimerization of (3S,3'S) astaxanthin from the alga was observed for the astaxanthin **esters** deposited in the skin of rainbow trout, with a ratio close to 1.0:2.0:1.0 (3S,3'S:3R,3'S:3R,3'R).

IT **144-68-3,** Zeaxanthin **472-61-7,** Astaxanthin
RL: BSU (Biological study, unclassified); BIOL (Biological study)
(carcass; utilization of (3S,3'S)-astaxanthin **acyl esters** in pigmentation of rainbow trout)

RN 144-68-3 CAPLUS
CN β,β-Carotene-3,3'-diol, (3R,3'R)- (9CI) (CA INDEX NAME)

Absolute stereochemistry.
Double bond geometry as shown.

PAGE 1-A



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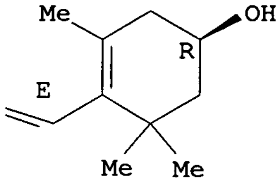
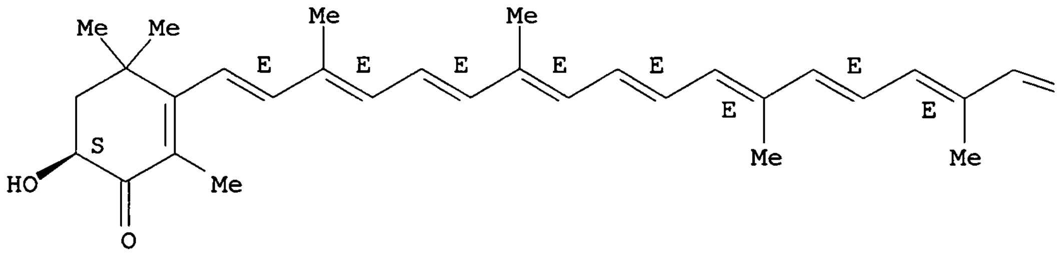


RN 472-61-7 CAPLUS
CN β,β-Carotene-4,4'-dione, 3,3'-dihydroxy-, (3S,3'S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry.
Double bond geometry as shown.

PAGE 1-A



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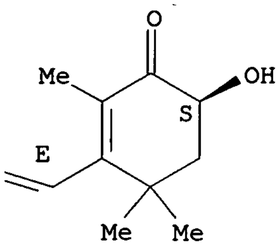
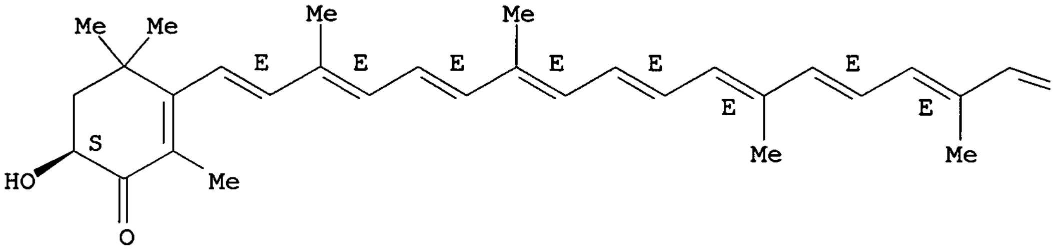


IT **472-61-7D**, Astaxanthin, **acyl esters**
RL: BSU (Biological study, unclassified); BIOL (Biological study)
(utilization of (3S,3'S)-astaxanthin **acyl esters** in pigmentation of rainbow trout)
RN 472-61-7 CAPLUS
CN β,β-Carotene-4,4'-dione, 3,3'-dihydroxy-, (3S,3'S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry.
Double bond geometry as shown.

PAGE 1-A



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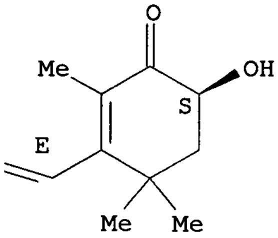

REFERENCE COUNT: 44 THERE ARE 44 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

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